the vibration and shock encountered under the normal operating conditions encountered in an automotive service environment.

(9) *Propane Equivalency Factor*. The Propane Equivalency Factor must be displayed in a manner that enables it to be viewed conveniently, while permitting it to be altered only by personnel specifically authorized to do so.

(c) *Analyzers*—(1) *Accuracy*. The analyzers must be of a design certified to meet the following accuracy requirements when calibrated to the span points specified in §85.2233(e)(2):

Channel	Range	Accuracy	Noise	Repeatability
HC, as hexane	0–400 ±12	6	8	
	401–1000 ±30	10	15	
	1001–2000 ±80	20	30	
CO, %	0–2.00 ±0.06	0.02	0.03	
	2.01–5.00 ±0.15	.06	.08	
	5.01–9.99 ±0.40	.10	.15	
CO_2, %	0–4.0 ±0.6	.2	.3	
	4.1–14.0 ±0.5	.2	.3	
	14.1–16.0 ±0.6	.2	.3	
NO, ppm	0–1000 ±32	16	20	
	1001–2000 ±60	25	30	
	2001–4000 ±120	50	60	

(2) *Minimum analyzer display resolution*. The analyzer electronics must have sufficient resolution to achieve the level of accuracy indicated in paragraphs (c)(2)(i) through (v) of this section.

(i) HC 1 ppm HC as hexane.

(ii) CO 0.01% CO.

(iii) CO2 0.1% CO_2.

(iv) NO 1 ppm NO.

(v) RPM 1 rpm.

(3) *Response time*. The response time from the probe to the display for HC, CO, and CO_2 analyzers may not exceed eight seconds to 90 percent of a step change in input. For NO analyzers, the response time may not exceed twelve seconds to 90 percent of a step change in input.

(4) *Display refresh rate*. Dynamic information being displayed must be refreshed at a minimum rate of twice per second.

(5) *Interference effects*. The interference effects for non-interest gases may not exceed ±10 ppm for hydrocarbons, ±0.05 percent for carbon monoxide, ±0.20 percent for carbon dioxide, and ±20 ppm for oxides of nitrogen.

(6) *Low flow indication*. The analyzer must provide an indication when the sample flow is below the acceptable level. The sampling system must be equipped with a flow meter (or equivalent) that indicates sample flow degradation when meter error exceeds three percent of full scale, or causes system response time to exceed 13 seconds to 90 percent of a step change in input, whichever is less.

(7) *Engine speed detection*. The analyzer must utilize a tachometer capable of detecting engine speed in revolutions per minute (rpm) with a 0.5 second response time and an accuracy of ±3 percent of the true rpm.

(8) *Test and mode timers*. The analyzer must be capable of simultaneously determining the amount of time elapsed in a test, and in a mode within that test.

(9) *Sample rate*. The analyzer must be capable of measuring exhaust concentrations of gases specified in this section at a minimum rate of once every 0.75 second.

(d) *Demonstration of conformity*. The analyzer must be demonstrated to the satisfaction of the inspection program manager, through acceptance testing procedures, to meet the requirements of this section and to be capable of being maintained as required in §85.2233.

[58 FR 58413, Nov. 1, 1993; 59 FR 33913, July 1, 1994]

§§ 85.2226–85.2228 [Reserved]

§ 85.2229 Dynamometer—EPA 81.

(a) *Applicability*. The requirements of this subsection apply to short tests

conducted under Emissions Performance Warranty through December 31, 1993. The requirements of § 85.2230 apply concurrently until December 31, 1993, after which the requirements of § 85.2230 are solely in effect. The following exceptions apply: in a state where the Administrator has approved a SIP revision providing for implementation of a basic centralized program meeting the requirements of part 51, subpart S of this chapter, according to the schedule specified in § 51.373 of this chapter, the requirements of this section are concurrently in effect until June 30, 1994 for 1995 and earlier model year vehicles or engines; in a state where the Administrator has approved a SIP revision providing for implementation of an enhanced program meeting the requirements of part 51, subpart S of this chapter, according to the schedule specified in § 51.373 of this chapter, the requirements of this section are concurrently in effect until December 31, 1995 for 1995 and earlier model year vehicles or engines.

(b) The loaded test dynamometer shall be adjusted to produce a load of 9.0 ±1.0 hp at 30 mph.

(c) Speed shall be measured from the dynamometer roll(s) with an accuracy of ±1.5 mph at 30 mph true roll speed.

[49 FR 24323, June 12, 1984. Redesignated and amended at 58 FR 58403, 58414, Nov. 1, 1993]

§ 85.2230 Steady state test dynamometer—EPA 91.

(a) *Special calendar and model year applicability.* The requirements of § 85.2229 apply concurrently for tests conducted under Emission Performance Warranty on 1995 and earlier model year vehicles or engines until December 31, 1993, after which the requirements of this section are solely in effect. The following exceptions apply: In a state where the Administrator has approved a SIP revision providing for implementation of a basic centralized program meeting the requirements of part 51, subpart S of this chapter, according to the schedule specified in § 51.373 of this chapter, the requirements of § 85.2229 are concurrently in effect until June 30, 1994 for 1995 and earlier model year vehicles or engines; in a state where the Administrator has approved a SIP revision providing for implementation of an enhanced program meeting the requirements of part 51, subpart S of this chapter, according to the schedule specified in § 51.373 of this chapter, the requirements of § 85.2229 are concurrently in effect until December 31, 1995 for 1995 and earlier model year vehicles or engines.

(b) The chassis dynamometer for steady state short tests must provide the capabilities described in paragraphs (b) (1) through (7) of this section.

(1) *Power absorption.* The dynamometer must be capable of applying a load to the vehicle's driving tire surfaces at the horsepower and speed levels specified in paragraph (c) of this section.

(2) *Short-term stability.* Power absorption at constant speed may not drift more than ±0.5 horsepower (hp) during any single test mode.

(3) *Roll weight capacity.* The dynamometer must be capable of supporting a driving axle weight up to four thousand (4,000) pounds or greater.

(4) *Between roll wheel lifts.* For dual-roll dynamometers, these must be controllable and capable of lifting a minimum of four thousand (4,000) pounds.

(5) *Roll brakes.* Rolls must be locked when the wheel lift is up.

(6) *Speed indications.* The dynamometer speed display must have a range of 0 mph to 60 mph (or 0 kph to 100 kph), and a resolution and accuracy of at least 1 mph (or 1 kph).

(7) *Safety interlock.* A roll speed sensor and safety interlock circuit must be provided which prevents the application of the roll brakes and upward lift movement at any roll speed above 0.5 mph (0.8 kph).

(c) The dynamometer must produce the load speed relationships specified in §§ 85.2217 and 85.2219.

[58 FR 58414, Nov. 1, 1993]

§ 85.2231 On-board diagnostic test equipment requirements.

(a) The test system interface to the vehicle shall include a plug that conforms to SAE J1962 ''Diagnostic Connector.'' The procedure shall be done in accordance with SAE J1962 ''Diagnostic Connector'' (JUN92). This incorporation of reference was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552 (a) and 1